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REMARKS**Rejection based upon 35 U.S.C. §103****a. Chatteroraj in view of Ridgway**

Claims 1-14 and 16-20 have been rejected under 35 U.S.C. §103(a) as being obvious over Chatteroraj et al. in view of Ridgway et al.

Applicants respectfully traverse the Examiner's rejection.

Chatteroraj et al. discloses a method of monitoring both the planktonic and sessile microbial populations in an industrial water system comprising the steps of: a) adding a fluorogenic dye directly into said industrial water system and allowing said fluorogenic dye to react with any planktonic or sessile microbiological organisms present; b) providing means for measurement of the fluorescent signals of said fluorogenic dye in said industrial water system, with the first fluorescent signal measurement being that of the fluorogenic dye and the second fluorescent signal measurement being that of the reacted fluorogenic dye; c) using said means for measurement of said fluorescent signals of said fluorogenic dye to measure the fluorescent signal of the fluorogenic dye and the fluorescent signal of the reacted fluorogenic dye, while discarding any measured fluorescent signal values below a predetermined noise level; d) calculating the Ratio of the measured fluorescent signal of the reacted fluorogenic dye to the fluorescent signal of the fluorogenic dye; and e) monitoring the change in calculated Ratio from step d) to determine the status of the planktonic and sessile microbiological populations in the industrial water system. This reference also discloses the additional steps of: 1) determining the optimal amount of biocide to be delivered to the industrial water system wherein said optimal amount is based upon the magnitude of said Ratio or the rate of change of said Ratio; and 2) delivering said optimal amount of biocide to the industrial water system. Moreover, the fluorogenic dye can be fed either by itself or in combination with water treatment agents that are typically fed into a cooling water system such as, but not limited to, scale and corrosion inhibitors.

Ridgway teaches how biofouling is a widespread problem limiting the performance and application of reverse osmosis and other membrane separation processes. The primary source of microbial contamination is typically the system feedwater, surface waters in particular contain

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high numbers of microorganisms which lead to microbial problems. With respect to monitoring and detecting membrane foulants, Ridgway teaches the use of optical microscopy, scanning and transmission microscopy, atomic force microscopy, x-ray fluorescence emission microscopy, attenuated total reflection Fourier transform infrared spectrometry (ATR-FTIR), energy-dispersive x-ray microanalysis, and Auger spectroscopy. The reference also teaches that the information obtained from optical microscopy can be extended and quantified by the use of organic dyes which preferentially react with fluorescent probes such as 2,4-diamidino-2-phenylindole, 5-cyano-2,3-ditoyl tetrazolium chloride, and rhodamine.

A prima facie case for obviousness requires the prior art references teach or suggest all the claim limitations of Applicants' invention and if the art teaches all the claimed limitations there must be a motivation by one of ordinary skill in the art to combine the references. See *In re Rouffet*, 149 F.3d 1350, 1357 (Fed. Cir. 1998); *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974); MPEP 2143. Applicants respectfully traverse the Examiner's rejection because the prior art references when combined do not teach or suggest all the claim limitations. Neither Chattoraj nor Ridgway teach or suggest the use of fluorometers to detect fluorescence in the feed stream, a first stream, or a second stream.

With respect to claim 1, the cited references do not teach or suggest the following limitations of claim 1: "providing one or more fluorometers to detect the fluorescent signal of the fluorogenic agent in at least one of the feed stream, the concentrate and optionally the permeate"; and "using said one or more fluorometers to detect the fluorescent signal of at least one of the fluorogenic agent and the reacted fluorogenic agent in at least one of the feed stream an the concentrate and optionally the permeate." (Emphasis added). Therefore, Applicants request that the Examiner allow claim 1.

With respect to claim 16, the cited references do not teach or suggest the following limitations of claim 16: "providing one or more fluorometers to detect the fluorescent signal of the fluorogenic agent and the fluorescent signal of the inert fluorescent tracer in at least one of the feed stream or the concentrate or optionally the permeate"; and "using said one or more fluorometers to detect the fluorescent signal of at least one of the fluorogenic agent and reacted fluorogenic agent and the inert fluorescent tracer in at least one of the feed stream and the concentrate and optionally the permeate." (Emphasis added). Therefore, Applicants request that the Examiner allow claim 16.

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Considering that claims 2-14 and 17-20 depend upon allowable base claims, claim 1 and claim 16, respectfully, Applicants request that the Examiner allow claims 2-14 and 15-20.

b. Chatteroraj in view of Ridgway and further in view of Zeiher or Hoots

Claims 1-20 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Chatteroraj et al. and Ridgway et al. as applied to claims 1-14, and 16-20 above, and further in view of Zeiher et al. (US 2003/0183575) or Hoots et al. (US Patent No. 5,435,969).

Applicants respectfully traverse the Examiner's rejection.

Chatteroraj et al. discloses a method of monitoring both the planktonic and sessile microbial populations in an industrial water system comprising the steps of: a) adding a fluorogenic dye directly into said industrial water system and allowing said fluorogenic dye to react with any planktonic or sessile microbiological organisms present; b) providing means for measurement of the fluorescent signals of said fluorogenic dye in said industrial water system, with the first fluorescent signal measurement being that of the fluorogenic dye and the second fluorescent signal measurement being that of the reacted fluorogenic dye; c) using said means for measurement of said fluorescent signals of said fluorogenic dye to measure the fluorescent signal of the fluorogenic dye and the fluorescent signal of the reacted fluorogenic dye, while discarding any measured fluorescent signal values below a predetermined noise level; d) calculating the Ratio of the measured fluorescent signal of the reacted fluorogenic dye to the fluorescent signal of the fluorogenic dye; and e) monitoring the change in calculated Ratio from step d) to determine the status of the planktonic and sessile microbiological populations in the industrial water system. This reference also discloses the additional steps of: 1) determining the optimal amount of biocide to be delivered to the industrial water system wherein said optimal amount is based upon the magnitude of said Ratio or the rate of change of said Ratio; and 2) delivering said optimal amount of biocide to the industrial water system. Moreover, the fluorogenic dye can be fed either by itself or in combination with water treatment agents that are typically fed into a cooling water system such as, but not limited to, scale and corrosion inhibitors.

Ridgway teaches how biofouling is a widespread problem limiting the performance and application of reverse osmosis and other membrane separation processes. The primary source of

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microbial contamination is typically the system feedwater, surface waters in particular contain high numbers of microorganisms which lead to microbial problems. With respect to monitoring and detecting membrane foulants, Ridgway teaches the use of optical microscopy, scanning and transmission microscopy, atomic force microscopy, x-ray fluorescence emission microscopy, attenuated total reflection Fourier transform infrared spectrometry (ATR-FTIR), energy-dispersive x-ray microanalysis, and Auger spectroscopy. The reference also teaches that the information obtained from optical microscopy can be extended and quantified by the use of organic dyes which preferentially react with fluorescent probes such as 2,4-diamidino-2-phenylindole, 5-cyano-2,3-ditoyl tetrazolium chloride, and rhodamine.

Hoots et al. discloses a method of monitoring a water treatment agent that is added to an industrial water system by the formation of a concentration indicator. Reacting an incipient agent with a water treatment agent forms the concentration indicator. The resulting concentration indicator is capable of being monitored by fluorometric means.

Zeicher et al. discloses a method of monitoring and controlling a membrane separation or process that involves the addition of an inert fluorescent tracer and a tagged fluorescent agent.

A *prima facie* case for obviousness requires the prior art references teach or suggest all the claim limitations of Applicants' invention and if the art teaches all the claimed limitations there must be a motivation by one of ordinary skill in the art to combine the references. *See In re Rouffet*, 149 F.3d 1350, 1357 (Fed. Cir. 1998); *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974); MPEP 2143. Applicants respectfully traverse the Examiner's rejection because the prior art references when combined do not teach or suggest all the claim limitations. Chittoraj, Ridgway, Hoots, and Zeicher do not teach or suggest the use of fluorometers to detect fluorescence in the feed stream, a first stream, or a second stream.

With respect to claim 1, the cited references do not teach or suggests the following limitations of claim 1: "providing one or more fluorometers to detect the fluorescent signal of the fluorogenic agent in at least one of the feed stream, the concentrate and optionally the permeate"; and "using said one or more fluorometers to detect the fluorescent signal of at least one of the fluorogenic agent and the reacted fluorogenic agent in at least one of the feed stream an the concentrate and optionally the permeate." (Emphasis added). Therefore, Applicants request that the Examiner allow claim 1.

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With respect to claim 16, the cited references do not teach or suggest the following limitations of claim 16: "providing one or more fluorometers to detect the fluorescent signal of the fluorogenic agent and the fluorescent signal of the inert fluorescent tracer in at least one of the feed stream or the concentrate or optionally the permeate"; and "using said one or more fluorometers to detect the fluorescent signal of at least one of the fluorogenic agent and reacted fluorogenic agent and the inert fluorescent tracer in at least one of the feed stream and the concentrate and optionally the permeate." (Emphasis added). Therefore, Applicants request that the Examiner allow claim 16.

Considering that claims 2-15 and 17-20 depend upon allowable base claims, claim 1 and claim 16, respectfully, Applicants request that the Examiner allow claims 2-15 and 17-20.

Rejection based upon Double Patenting

a. **Chattoraj in view of Ridgway**

Claims 1-5, 7-14, and 16-20 have been rejected under the judicially created doctrine of obvious-type double patenting as being unpatentable over claims 1-15 of Chattoraj et al. in view of Ridgway et al.

Applicants respectfully traverse the Examiner's rejection.

Chatteroraj et al. discloses a method of monitoring both the planktonic and sessile microbial populations in an industrial water system comprising the steps of: a) adding a fluorogenic dye directly into said industrial water system and allowing said fluorogenic dye to react with any planktonic or sessile microbiological organisms present; b) providing means for measurement of the fluorescent signals of said fluorogenic dye in said industrial water system, with the first fluorescent signal measurement being that of the fluorogenic dye and the second fluorescent signal measurement being that of the reacted fluorogenic dye; c) using said means for measurement of said fluorescent signals of said fluorogenic dye to measure the fluorescent signal of the fluorogenic dye and the fluorescent signal of the reacted fluorogenic dye, while discarding any measured fluorescent signal values below a predetermined noise level; d) calculating the Ratio of the measured fluorescent signal of the

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the change in calculated Ratio from step d) to determine the status of the planktonic and sessile microbiological populations in the industrial water system. This reference also discloses the additional steps of: 1) determining the optimal amount of biocide to be delivered to the industrial water system wherein said optimal amount is based upon the magnitude of said Ratio or the rate of change of said Ratio; and 2) delivering said optimal amount of biocide to the industrial water system. Moreover, the fluorogenic dye can be fed either by itself or in combination with water treatment agents that are typically fed into a cooling water system such as, but not limited to, scale and corrosion inhibitors.

Ridgway teaches how biofouling is a widespread problem limiting the performance and application of reverse osmosis and other membrane separation processes. The primary source of microbial contamination is typically the system feedwater, surface waters in particular contain high numbers of microorganisms which lead to microbial problems. With respect to monitoring and detecting membrane foulants, Ridgway teaches the use of optical microscopy, scanning and transmission microscopy, atomic force microscopy, x-ray fluorescence emission microscopy, attenuated total reflection Fourier transform infrared spectrometry (ATR-FTIR), energy-dispersive x-ray microanalysis, and Auger spectroscopy. The reference also teaches that the information obtained from optical microscopy can be extended and quantified by the use of organic dyes which preferentially react with fluorescent probes such as 2,4-diamidino-2-phenylindole, 5-cyano-2,3-ditoyl tetrazolium chloride, and rhodamine.

A prima facie case for obviousness requires the prior art references teach or suggest all the claim limitations of Applicants' invention and if the art teaches all the claimed limitations there must be a motivation by one of ordinary skill in the art to combine the references. *See In re Rouffet*, 149 F.3d 1350, 1357 (Fed. Cir. 1998); *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974); MPEP 2143. Applicants respectfully traverse the Examiner's rejection because the prior art references when combined do not teach or suggest all the claim limitations. Neither Chattoraj nor Ridgway teach or suggest the use of fluorometers to detect fluorescence in the feed stream, a first stream, or a second stream.

With respect to claim 1, the cited references do not teach or suggest the following limitations of claim 1: "providing one or more fluorometers to detect the fluorescent signal of the fluorogenic agent in at least one of the feed stream, the concentrate and optionally the permeate"; and "using said one or more fluorometers to detect the fluorescent signal of at least

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permeate"; and "using said one or more fluorometers to detect the fluorescent signal of at least one of the fluorogenic agent and the reacted fluorogenic agent in at least one of the feed stream and the concentrate and optionally the permeate." (Emphasis added). Therefore, Applicants request that the Examiner allow claim 1.

With respect to claim 16, the cited references do not teach or suggest the following limitations of claim 16: "providing one or more fluorometers to detect the fluorescent signal of the fluorogenic agent and the fluorescent signal of the inert fluorescent tracer in at least one of the feed stream or the concentrate or optionally the permeate"; and "using said one or more fluorometers to detect the fluorescent signal of at least one of the fluorogenic agent and reacted fluorogenic agent and the inert fluorescent tracer in at least one of the feed stream and the concentrate and optionally the permeate." (Emphasis added). Therefore, Applicants request that the Examiner allow claim 16.

Considering that claims 2-5 and 7-14 depend on an allowable base claim, claim 1, and claims 17-20, depend on an allowable base claim, claim 16, Applicants request that the Examiner allow claims 2-5, 7-14, and 17-20.

b. U.S. Patent No. 6,699,684

Claims 1-13, 16, and 18-20 have been rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-19 of U.S. Patent No. 6,699,684.

Applicants obviate the rejection by filing a terminal disclaimer.

c. Copending Application No. 10/721,667

Claims 1-13, 16, and 18-20 have been rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-7 of Applicants' copending application no. 10/721,667.

Applicants obviate the rejection by filing a terminal disclaimer.

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CONCLUSION

Applicants respectfully request that a Notice of Allowance be sent for all pending claims.

Respectfully Submitted,

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